

IN THE CLAIMS

The following are Claims 1-22.

1. (Currently Amended) A circuit comprising:

a diode string coupled to a supply voltage line; and
a transistor coupled to the diode string and to a reference voltage line, wherein the diode string and the transistor are implemented in a cascode configuration and provide electrostatic discharge protection; and

wherein the diode string comprises:

a first diode coupled between the supply voltage line and the transistor and disposed such that the first diode is forward biased from the supply voltage line to the transistor, wherein the first diode is adapted to provide electrostatic discharge protection having a first polarity;
and

a second diode coupled to the supply voltage line and the transistor and parallel to the first diode, wherein the second diode is adapted to provide electrostatic discharge protection having a second polarity.

2. (Currently Amended) The circuit of Claim 1, wherein the diode string further comprises [[-]] a third diode arranged

LAW OFFICES OF
MACPHERSON KWOK
CITRON & KEID LLP
2402 Michelson Drive
SUITE 310
Irvine, CA 92612
(949) 753-7040
FAX (949) 753-7049

in series with the first diode with a cathode of the first diode coupled to an anode of the third diode, and wherein the second diode is further in parallel with the transistor.

~~at least a first diode coupled between the supply voltage line and the reference voltage line and adapted to provide electrostatic discharge protection having a first polarity, and~~

~~at least a second diode coupled to the supply voltage line and adapted to provide electrostatic discharge protection having a second polarity.~~

3. (Currently Amended) The circuit of Claim 1 [[2]], wherein the second diode has at least a first terminal coupled to a drain terminal of the transistor.

4. (Original) The circuit of Claim 1, wherein the transistor and the diode string have different diffusion regions.

5. (Original) The circuit of Claim 1, further comprising a resistor coupled between a gate terminal of the transistor and the reference voltage line, wherein the circuit provides electrostatic discharge protection for a power rail of an integrated circuit incorporating the circuit.

LAW OFFICES OF
MACPHERSON KWOK
CHEN & HEID LLP

2407 Michelson Drive
SUITE 210
Irvine, CA 92612
(949) 753-7040
FAX (949) 753-7049

6. (Original) The circuit of Claim 1, further comprising a pull-up circuit coupled between the supply voltage line and the diode string, wherein the pull-up circuit and the diode string are coupled to an input pad and/or an output pad, the transistor is adapted to receive a control signal at its gate terminal, and the circuit provides electrostatic discharge protection for an interface of an integrated circuit incorporating the circuit.

7. (Original) The circuit of Claim 6, wherein the circuit is adapted to operate as a driver.

8. (Original) The circuit of Claim 1, wherein the circuit is adapted to operate in a mixed voltage environment.

9. (Original) The circuit of Claim 1, wherein one or more diodes within the diode string may be implemented as bipolar transistors.

10. (Currently Amended) A programmable logic device comprising:

at least a first diode coupled between a supply voltage line and a reference voltage line and having an anode coupled to the supply voltage line, wherein the at least first diode is adapted to protect from electrostatic discharge of a first polarity;

LAW OFFICES OF
MCGRANAHAN KWOK
COHEN & REED LLP
2402 Michaelized Drive
SUITE 210
Irvine, CA 92612
(949) 753-1040
FAX (949) 752-3069

at least a second diode coupled between the supply voltage line and the reference voltage line and in parallel with the at least first diode, wherein the at least second diode is adapted to protect from electrostatic discharge of a second polarity; and

a transistor coupled between the at least first diode and the reference voltage line.

11. (Original) The programmable logic device of Claim 10, wherein the transistor and the at least first diode are implemented in a cascode configuration and adapted to operate in a mixed voltage environment.

12. (Original) The programmable logic device of Claim 11, wherein the transistor and the at least first diode have different diffusion regions.

13. (Original) The programmable logic device of Claim 10, further comprising a resistor coupled between a gate terminal of the transistor and the reference voltage line, wherein the at least first diode, the at least second diode, the transistor, and the resistor provide electrostatic discharge protection for a power rail of the programmable logic device.

LAW OFFICES OF
MACPHERSON KWOK
CHEN & HEID LLP

2402 Leichtag Drive
SUITE 310
Irvine, CA 92613
(949) 752-7040
FAX (949) 752-7049

14. (Original) The programmable logic device of Claim 10, wherein the at least second diode has a first terminal coupled to a drain terminal of the transistor.

15. (Original) The programmable logic device of Claim 10, further comprising a pull-up circuit coupled between the supply voltage line and the at least first diode, wherein the pull-up circuit and the at least first diode are coupled to a pad, the transistor is adapted to receive a control signal at its gate terminal, and the at least first diode, the at least second diode, and the transistor provide electrostatic discharge protection for an interface of the programmable logic device.

16. (Original) The programmable logic device of Claim 10, wherein the at least first diode and/or the at least second diode comprise a bipolar transistor.

17. (Currently Amended) A method of providing electrostatic discharge protection, the method comprising:

providing at least a first diode having an anode coupled to a supply voltage rail to protect from electrostatic discharge of a first polarity;

providing a transistor coupled between the at least first diode and a reference voltage rail; and

LAW OFFICES OF
MACPHERSON KIVOK
CHAN & KEDD LLP
2401 Michelson Drivs
Suite 210
Irvine, CA 92612
(949) 753-7040
FAX (949) 753-7069

providing at least a second diode coupled to the supply voltage rail and to the reference voltage rail or between the at least first diode and the transistor to protect from electrostatic discharge of a second polarity, wherein the at least first diode and the transistor are implemented in a cascode configuration.

18. (Original) The method of Claim 17, wherein the at least first diode and the transistor are implemented having different diffusions.

19. (Original) The method of Claim 17, further comprising operating the at least first diode, the at least second diode, and the transistor as a clamp circuit.

20. (Original) The method of Claim 17, further comprising operating the at least first diode, the at least second diode, and the transistor as a driver to transfer data via a pad.

21. (Original) The method of Claim 17, further comprising providing a pull-up circuit between the supply voltage rail and the at least first diode.

22. (Original) The method of Claim 17, wherein the at least first diode and/or the at least second diode comprise a bipolar transistor.

LAW OFFICES OF
MACPHERSON KWOK
CHEN & HEDD LLP
2402 Michelson Drive
SUITE 210
Irvine, CA 92612
(714) 752-7049
FAX (714) 753-7049